

## Features

- wear-resistant compact design, with stainless steel 1.4571 monitoring head and housing
- suitable for air, compressed air, nitrogen and oxygen
- 4 ... 20 mA analogue output (4 mA = 0 Nm<sup>3</sup>/h, 20 mA = operating range final value)
- switching output: switch point can be adjusted steplessly or to 10 predefined values regardless of the actual flow speed
- pulse output: adjustable quantity per pulse
- 10 x LED bar (red, green, orange) which shows the actual flow rate and the status of the switching point or the pulse output configuration
- fluid temperature -20 ... 90 °C
- 4-core PVC cable, 4x0,34 mm<sup>2</sup>, conductor resistance 56 Ω/km
- switching output/pulse output with HighSide-FET output
- protected against short circuits and overloads



## Ranges of application

	gases	dust
category 1	zone 0	zone 20
category 2	zone 1	✓ zone 21 ✓
category 3	zone 2	✓ zone 22 ✓

## FC50-dbEX-CA

EU-type-examination certificate to EN IEC 60079-0:2018, EN 60079-1:2014 and EN 60079-31:2014

Ex II 2G Ex db IIC T4 Gb

Ex II 2D Ex tb IIIC T95°C...T120°C Db

## Ordering information

### Flow meter (calorimetric)

FC50-dbEX-CA in compact housing

Power supply									
U1	DC 24 V								
Switching output/pulse output									
MIN minimum switching point									
MAX maximum switching point									
PUL pulse output, only with process connection 11									
Analogue output									
C11 4 ... 20 mA (0 Nm <sup>3</sup> /h ... operating range final value)									
Operating range									
FB2 operating range final value 100 Nm/s									
FB1 operating range final value 25 Nm/s									
Characteristic curve									
PC1 characteristic curve for TP01, only with process connection 11									
PC2 characteristic curve for TP02, only with process connection 11									
PC3 characteristic curve for TP03/BV03, only with process connection 11									
PC4 characteristic curve for TP04/BV04, only with process connection 11									
PC5 characteristic curve for TP05/BV05, only with process connection 11									
PC6 characteristic curve for TP06/BV06, only with process connection 11									
TC1 characteristic curve for pipes with inside diameter < 26,0 mm, only with process connection 01 and 02									
TC2 characteristic curve for pipes with inside diameter 26,0 ... 32,8 mm, only with process connection 01 and 02									
TC3 characteristic curve for pipes with inside diameter > 32,8 ... 40,3 mm, only with process connection 01 and 02									
TC4 characteristic curve for pipes with inside diameter > 40,3 ... 53,0 mm, only with process connection 01 and 02									
TC5 characteristic curve for pipes with inside diameter > 53,0 mm, only with process connection 01 and 02									
FC1 characteristic curve for pipes with inside diameter > 50,0 ... 67,0 mm, only with process connections 00 and 22									
FC2 characteristic curve for pipes with inside diameter > 67,0 mm, only with process connections 00 and 22									
Fluid									
A air, compressed air, oxygen, nitrogen									
Process connection									
00 push-in type, length 300 mm - without flange, threaded installation bush as accessory									
22 push-in type, length 200 mm - without flange, threaded installation bush as accessory									
01 screw-in type, G1/2A (to DIN 3852-A), length 36 mm									
02 screw-in type, NPT1 1/2"-14, length 36 mm									
11 plug-in type (following DIN ISO 6149), length 18.2 mm for TP or BV adapters									
Fitting material									
M1 stainless steel 1.4571 (standard material)									
M2 Hastelloy C4 2.4610									
Cable length									
Z05 5 m cable									
Z10 10 m cable									
Z20 20 m cable									
Z40 40 m cable									
Certification									
T5 ATEX approval									
FC50-dbEX-CA-	U1	MIN	C11	-	FB2	PC1	A	-	11
							M1	Z05	-
									T5
									ordering example

**TECHNICAL DATA (T<sub>U</sub> = 25 °C, U<sub>B</sub> = DC 24 V)**

General data				
Suitable for		air, compressed air, oxygen, nitrogen		
Temperature range	fluid	-20 ... +90 °C		
	ambience	-20 ... +65 °C		
Status indication		10 x LED bar (red, green, orange)		
Pulse output		1 pulse per 0,01/0,1/1/10/100 Nm <sup>3</sup> (adjustable, pulse width 50 ms)		
Electrical data				
Operating voltage U <sub>B</sub>		DC 24 V (± 20 %, at the device – please consider voltage drop)		
Power consumption (without load)		ca. 75 mA		
Analogue output	flow rate	4 ... 20 mA (12 bit), 4 mA = 0 Nm <sup>3</sup> /h, 20 mA = operating range final value		
Switching output/ pulse output	flow rate	Power FET, high side switch, short circuit proof max. load 500 mA, inductive load max. 100 mA		
MTTF (SN 29500)		267 years		
Flow measurement <sup>(6)</sup>				
Measuring range (operating range)	plug-in type TP-01	FB1	0...18,10 Nm <sup>3</sup> /h (0...18,10 Nm <sup>3</sup> /h)	
		FB2	0...49,22 Nm <sup>3</sup> /h (0...72,38 Nm <sup>3</sup> /h)	
	plug-in type TP-02	FB1	0...28,27 Nm <sup>3</sup> /h (0...28,27 Nm <sup>3</sup> /h)	
		FB2	0...76,91 Nm <sup>3</sup> /h (0...113,1 Nm <sup>3</sup> /h)	
	plug-in type TP-03/BV-03	FB1	0...44,18 Nm <sup>3</sup> /h (0...44,18 Nm <sup>3</sup> /h)	
		FB2	0...120,2 Nm <sup>3</sup> /h (0...176,7 Nm <sup>3</sup> /h)	
	plug-in type TP-04/BV-04	FB1	0...72,38 Nm <sup>3</sup> /h (0...72,38 Nm <sup>3</sup> /h)	
		FB2	0...196,9 Nm <sup>3</sup> /h (0...289,5 Nm <sup>3</sup> /h)	
	plug-in type TP-05/BV-05	FB1	0...113,1 Nm <sup>3</sup> /h (0...113,1 Nm <sup>3</sup> /h)	
		FB2	0...307,6 Nm <sup>3</sup> /h (0...452,4 Nm <sup>3</sup> /h)	
	plug-in type TP-06/BV-06	FB1	0...176,7 Nm <sup>3</sup> /h (0...176,7 Nm <sup>3</sup> /h)	
		FB2	0...480,7 Nm <sup>3</sup> /h (0...706,9 Nm <sup>3</sup> /h)	
	screw-in type/push-in type	FB1	0...25 Nm/s (0...25 Nm/s) - Nm <sup>3</sup> /h depends on pipe diameter, see table	
		FB2	0...68 Nm/s (0...100 Nm/s) - Nm <sup>3</sup> /h depends on pipe diameter, see table	
Accuracy <sup>(4)</sup>	plug-in type	3 ... 50% of the measuring range	± 3 % of measured value ± 0,3 % of measuring range final value	
		50 ... 100% of the measuring range	± 5 % of measured value ± 1 % of measuring range final value	
	screw-in/ push-in type	3 ... 50% of the measuring range	± 4 % of measured value ± 0,75 % of measuring range final value	
		50 ... 100% of the measuring range	± 7 % of measured value ± 1 % of measuring range final value	
Repeatability <sup>(1)</sup>		± 1 % of measured value ± 0,5 % of measuring range final value		
Response time <sup>(3)</sup>		approx. 2 s		
Temperature drift (+10 ... +70 °C)		± 0,06 % of measuring range final value/°C		
Pressure drift		approx. ± 0,5 % of measured value/bar		
Mechanical data				
Type and size of monitoring head	plug-in type	following DIN ISO 6149		
	screw-in type	G 1/2 A, NPT 1/2"		
	push-in type	shank diameter 18 mm/0.709 in. without thread		
Pressure resistance	monitoring head, all types	100 bar (observe pressure resistance of installation)		
Degree of protection		IP67		
Material	fitting, sensor	stainless steel 1.4571 (wetted)		
	connection sensor/fitting	laser welded		
	housing	stainless steel 1.4571		
	cable	PVC		
	cable gland	nickel-plated brass, NBR, FKM		
	cap	stainless steel 1.4571		
	O-ring	EPDM (wetted, plug-in type)		
Weight	plug-in type	approx. 905 g		
	screw-in type	approx. 815 g		
	push-in type 200 mm	approx. 1015 g		
	push-in type 300 mm	approx. 1125 g		

<sup>(1)</sup> at constant temperature and flow conditions, and stable thermal conductivity

<sup>(3)</sup> delay with the switch point set to 18 Nm/s and the flow at 20 Nm/s, after a sudden complete stop

<sup>(4)</sup> the accuracy values were determined under ideal conditions: symmetrical complete flow profile, correct mounting in the pipe, inlets and outlets according to EN ISO 5167-1

<sup>(6)</sup> Sensor calibration is performed at approx. 25 °C and approx. 970 mbar abs. in TP-03, inside pipe diameter 29,7 mm (FC50...01/02) and inside pipe diameter 79,2 mm (FC50...00) respectively.  
Specifications dependent on the measuring range final value always refer to 68 Nm/s (FB2).

### Operating ranges

The operating/measuring ranges are determined by the inner pipe diameter (see table). They can be calculated with the following equation:

$$Q = V_n \times A_r$$

$Q$  (Nm³/h) - flow quantity

$V_n$  (Nm/h) - average standard velocity

$A_r$  (m²) - inner pipe cross section

Standard velocity measuring range (FC50...FB2...): 0 ... 68 Nm/s

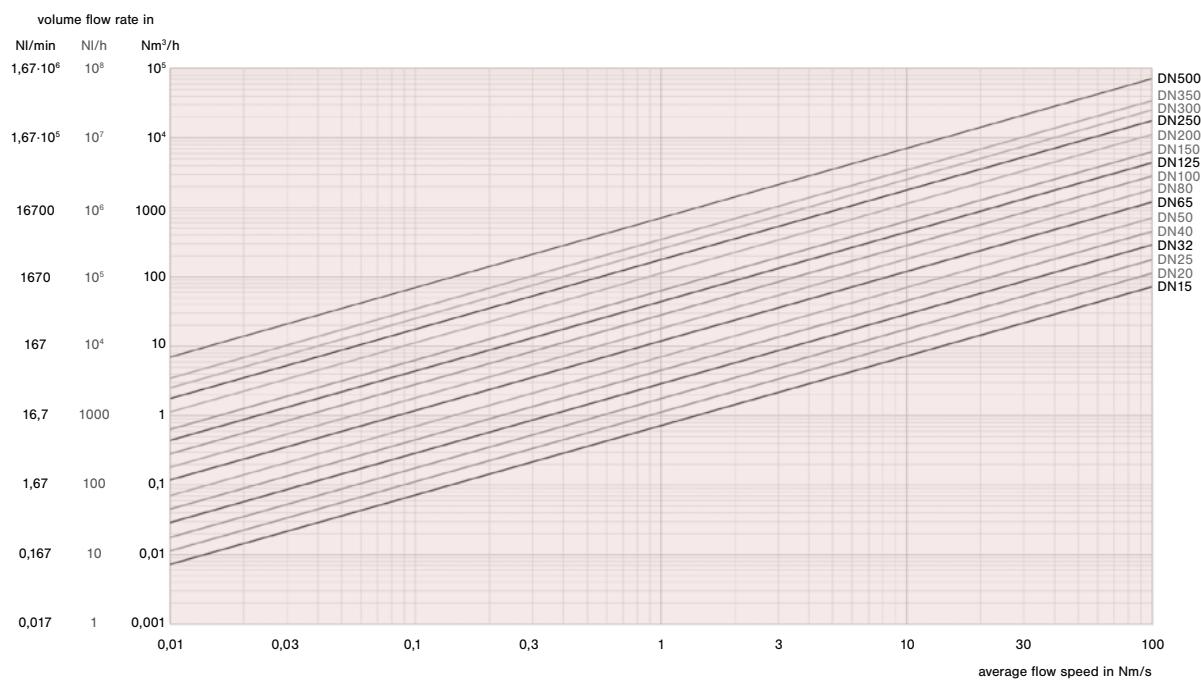
Standard velocity operating range (FC50...FB2...): 0 ... 100 Nm/s

Standard velocity measuring range (FC50...FB1...): 0 ... 25 Nm/s

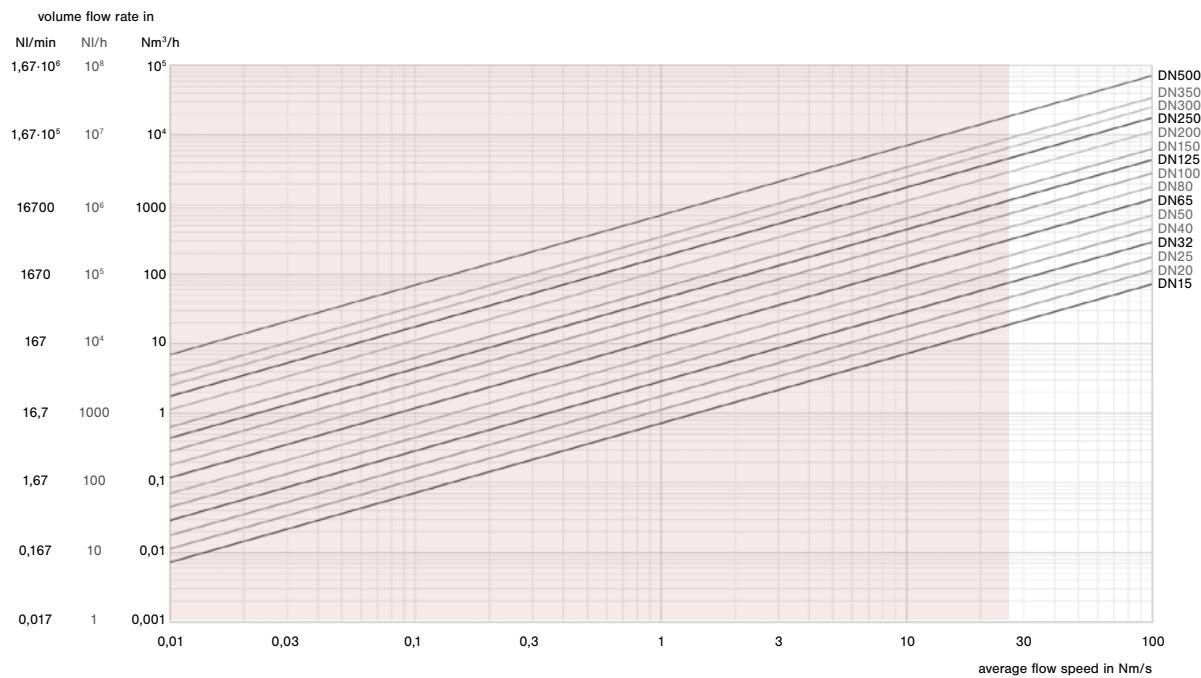
Standard velocity operating range (FC50...FB1...): 0 ... 25 Nm/s

inner pipe diameter D in mm	operating range FB1 in Nm³/h	operating range FB2 in Nm³/h	inner pipe diameter D in mm	operating range FB1 in Nm³/h	operating range FB2 in Nm³/h
20	28	113	200	2827	11309
30	63	254	250	4417	17671
40	113	452	300	6361	25446
50	176	706	400	11309	45239
60	254	1017	500	17671	70685
70	346	1385	600	25446	101787
80	452	1809	700	34636	138544
90	572	2290	800	45238	180955
100	706	2827	900	57255	229021
150	1590	6361	1000	70685	282743

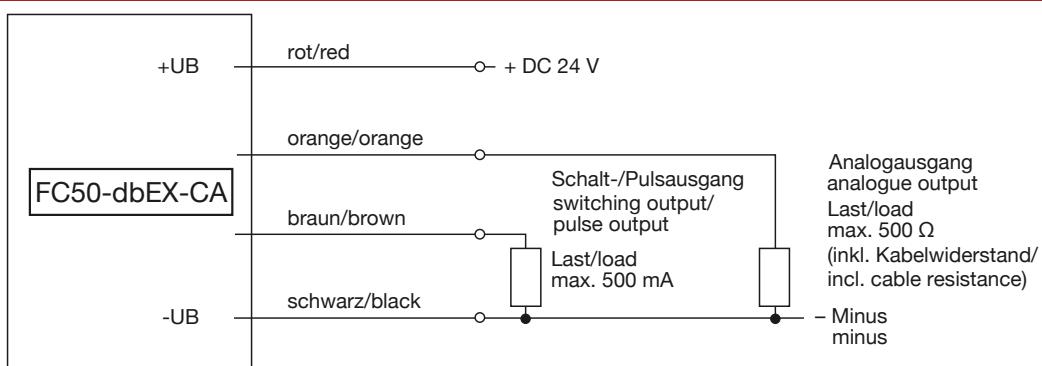
### Operating range FB2



### Operating range FB1

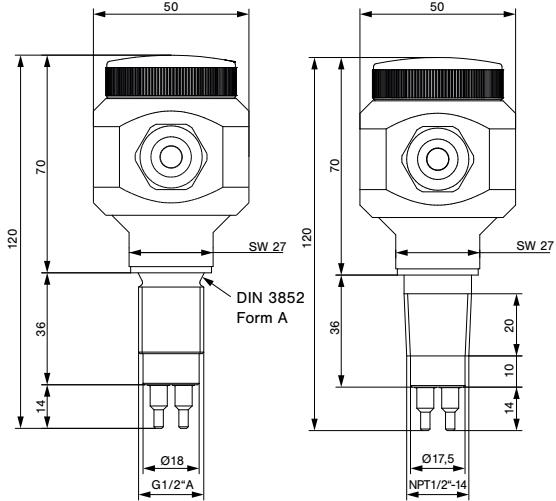


### Electrical connection

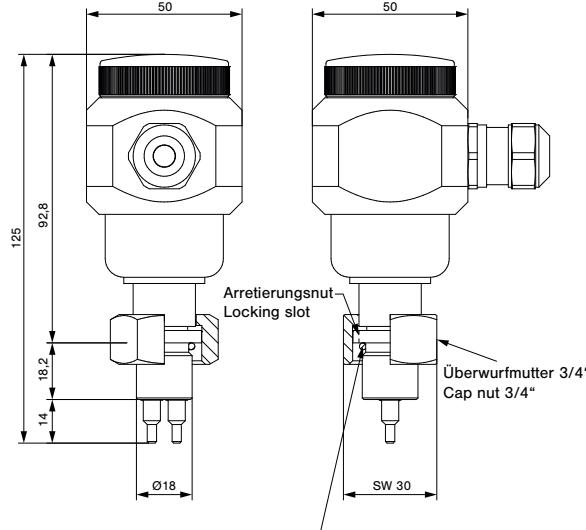


### Dimensions

#### Gewindeanschluss Screw-in type process connection

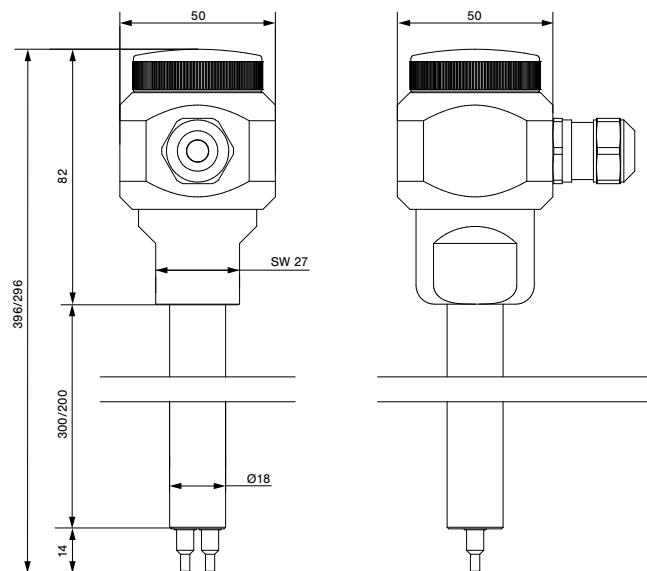


#### Einstockanschluss Plug-in type process connection



O-Ring 15,3x2,2 in Anlehnung an DIN ISO 6149, Material: FKM  
O-Ring 15,3x2,2 following DIN ISO 6149, material: FKM

#### Einschiebeanschluss Push-in type process connection



Alle Abmessungen in mm  
All dimensions in mm

### Sensoradapter TP/Ball valve BV



TP-...

BV-...

### Description

Sensor adapters TP and BV facilitate correct positioning and exchange of FC50-...11... (plug-in type connection) in pipes with process connection DN 15...DN 50.

Ball valve BV enables pressure-free installation or removal of FC50-...11... (plug-in type connection) simply by closing the input and output pipe. The measuring points are suited to temporary measurements; after completion of the measuring cycle they can be closed by means of blanking plugs.

### Features

- Correct positioning of sensor
- Ease of sensor replacement
- Measuring point can be closed if not used
- Sensor adapter available as screw-in or welding type
- Ball valve also serves as a shutoff valve (both input and out output)

### Ordering information – sensor adapter TP/thread

#### Type

**TP** Sensor adapter with internal thread

#### Process connection/Nominal size

01	DN 15	G 1/2	internal thread	length: 50 mm/1.97 in.
02	DN 20	G 3/4	internal thread	length: 64 mm/2.52 in.
03	DN 25	G 1	internal thread	length: 78 mm/3.07 in.
04	DN 32	G 1 1/4	internal thread	length: 94 mm/3.70 in.
05	DN 40	G 1 1/2	internal thread	length: 110 mm/4.33 in.
06	DN 50	G 2	internal thread	length: 138 mm/5.43 in.

#### Material of the area exposed to fluid

M1	stainless steel 1.4571/AISI 316Ti	PN 315 bar/4570 psi
M3	brass (not TP-03..)	PN 25 bar/363 psi
M5	red brass (only TP-03..)	PN 16 bar/232 psi

TP - 01 M3 ordering example

### Accessories

Description	Ref. No.
Blanking plug, brass, with O ring	0Z121Z000186
Union nut, brass	Y 306 901 01
Blanking plug, stainless steel 1.4571/AISI 316 Ti, with viton O ring	0Z121Z000187
Union nut, stainless steel	Y 306 901 03

### Ordering information – sensor adapter TP/welding

#### Type

**TP** Sensor adapter with welding nipples

#### Process connection/Nominal size

01	DN 15	dia.d: 16 mm/.630 in.	length: 80 mm/3.15 in.
02	DN 20	dia.d: 20 mm/.787 in.	length: 70 mm/2.76 in.
03	DN 25	dia.d: 25 mm/.984 in.	length: 80 mm/3.15 in.
04	DN 32	dia.d: 32 mm/1.26 in.	length: 100 mm/3.94 in.
05	DN 40	dia.d: 40 mm/1.57 in.	length: 110 mm/4.33 in.
06	DN 50	dia.d: 50 mm/1.97 in.	length: 140 mm/5.51 in.

#### Material of the area exposed to fluid

M1	stainless steel 1.4571/AISI 316Ti
M3	nickel plated brass, Delrin seal

#### Process connection

SA	welded connection
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TP - 01 M1 - SA ordering example

### Ordering information – ball valve

#### Type

**BV** ball valve with internal thread

#### Process connection/Nominal size

03	DN 25	G 1	internal thread	length: 88 mm/3.46 in.
04	DN 32	G 1 1/4	internal thread	length: 100 mm/3.94 in.
05	DN 40	G 1 1/2	internal thread	length: 110 mm/4.33 in.
06	DN 50	G 2	internal thread	length: 131 mm/5.16 in.

#### Material of the area exposed to fluid

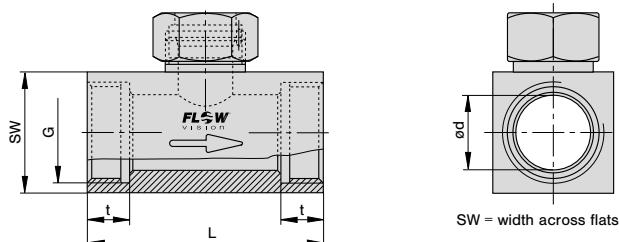
M3	nickel plated brass, Delrin seal
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BV - 03 M3 ordering example

Die zur Verfügung gestellten Informationen sind nach unserem Wissen genau und zuverlässig, jedoch übernimmt FlowVision keine Verantwortung für den Einsatz in einer Anwendung, die nicht der vorliegenden Spezifikation entspricht. FlowVision behält sich das Recht vor, Spezifikationen im Sinne des technischen Fortschritts jederzeit zu ändern. Maßänderungen sind vorbehalten, bei Bedarf bitte neuestes Maßblatt mit Toleranzen anfordern. Maße, Daten, Abbildungen und Beschreibung entsprechen dem neuesten Stand bei Herausgabe dieses Kataloges, sind aber unverbindlich! Änderungen sowie auch Irrtümer und Druckfehler vorbehalten. Die Bestellbezeichnung der Geräte kann von deren Beschriftung abweichen.

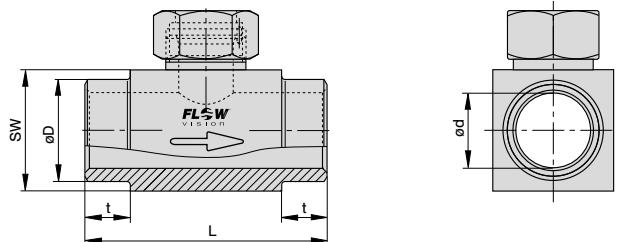
### Dimensions

#### TP... sensor adapter with internal thread



Type	DN	dia. d	G	t	L	SW
	mm	in.	mm	in.	mm	in.
TP-01 ...	15	.591	16	.630	11	.433
TP-02 ...	20	.787	20	.787	3/4"	12
TP-03 ...	25	.984	25	.984	1"	14
TP-04 ...	32	1.26	32	1.26	1 1/4"	15
TP-05 ...	40	1.57	40	1.57	1 1/2"	15
TP-06 ...	50	1.97	50	1.97	2"	19

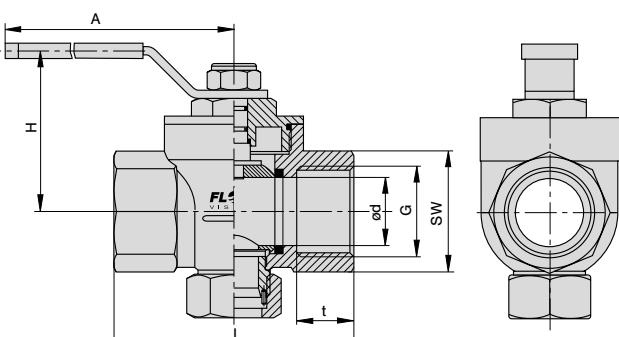
#### TP... M1-SA sensor adapter with welding nipples



PN 315 bar / 4569 psi

Type	DN	dia. d	dia. D	t	L	SW
	mm	in.	mm	in.	mm	in.
TP-01M1-SA	15	.591	16	.630	21.3	.839
TP-02M1-SA	20	.787	20	.787	26.9	1.06
TP-03M1-SA	25	.984	25	.984	33.7	1.33
TP-04M1-SA	32	1.26	32	1.26	42.4	1.67
TP-05M1-SA	40	1.57	40	1.57	48.3	1.90
TP-06M1-SA	50	1.97	50	1.97	60.3	2.37

#### BV... M3 Ball valve with internal thread

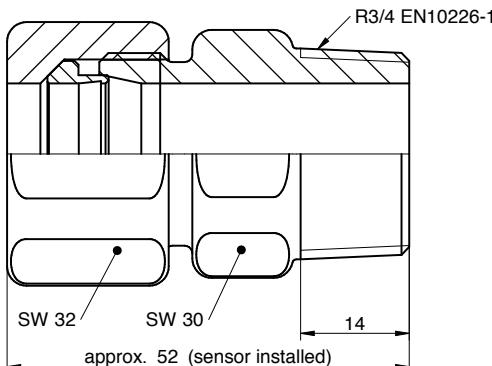


PN 25 bar / 363 psi

Type	DN	dia. d	G	t	L	SW	H	A
	mm	in.	mm	in.	mm	in.	mm	in.
BV-03M3	25	.984	25	.984	1"	.827	88	3.47
BV-04M3	32	1.26	32	1.26	1 1/4"	.945	100	3.94
BV-05M3	40	1.57	40	1.57	1 1/2"	.945	110	4.33
BV-06M3	50	1.97	50	1.97	2"	1.10	131	5.16

This is a metric design and millimeter dimensions take precedence ( $\frac{\text{mm}}{\text{inch}}$ )

### Compression fitting



### Description and ordering information

Compression fitting for push-in sensors with R3/4 thread

#### Compression fitting for push-in sensors

**EEF** Compression fitting

##### Process connection

**04** Thread R3/4

##### Material double nipple and cap nut

**M1** Stainless steel 1.4571

**M2** Hastelloy C4 2.4610

##### Material clamping ring

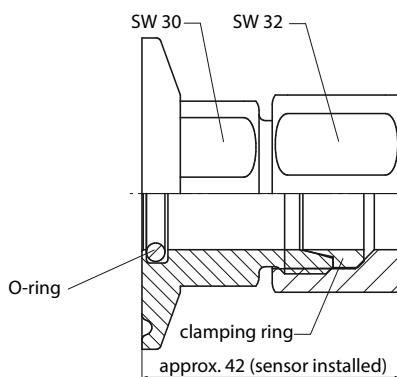
**CR1** Stainless steel 1.4571 PN 25 bar abs.

**CR2** PTFE PN 5 bar abs.

**CR3** Hastelloy C4 2.4610 PN 25 bar abs.

**EEF - 04 - M1 - CR1** ordering example

### Hygiene flange



### Description and ordering information

Hygiene flange for push-in sensors with front-flush o-ring with FDA approval

#### Hygiene flange for push-in sensors

**HEF** Hygiene flange

##### Process connection

**TF1** Triclamp DIN 32676

##### Material flange and cap nut

**M1** Stainless steel 1.4571

**M2** Hastelloy C4 2.4610

##### O-ring

**R1** VMQ (Silicone) blue FDA (standard)

**R2** VMQ (Silicone) white FDA

##### Material clamping ring

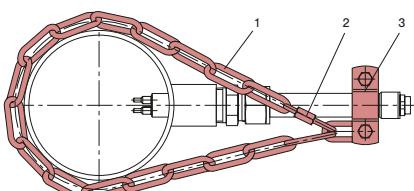
**CR1** Stainless steel 1.4571 PN 25 bar abs.

**CR2** PTFE PN 5 bar abs.

**CR3** Hastelloy C4 2.4610 PN 25 bar abs.

**HEF - TF1 - M1 - R1 - CR1** ordering example

### Locking set



### Description and ordering information

Locking set for push-in sensors.

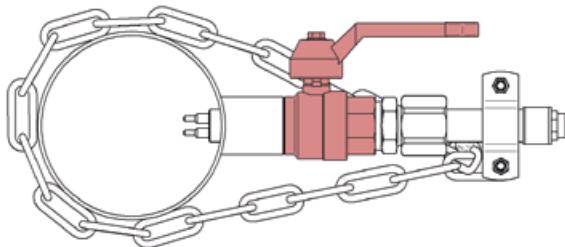
1 Chain 4 x 32 DIN 5685 (approx. 1 m)

2 Catch for chain NG 5

3 Clip with screw and nuts DN15 to DIN 11850

**Ordering no.:** 0Z122Z000204

### Ball valve for installation under pressure



### Description and ordering information

#### Material (body, ball):

Brass nickel plated

#### Material (ball seal):

PTFE

**Length:** 65 mm

**Outside thread:** G3/4“, L = 13 mm

**Inside thread:** G3/4“, L = 15 mm

**Fluid temperature:** -20...120 °C

**Ambient temperature:** 0...80 °C

**Pressure:** PN 25 bar (up to 80 °C)

**Ordering number:** BV-02M3-PI

#### Material (body, ball):

Stainless steel 1.4408, 1.4401

#### Material (ball seal):

PTFE

**Length:** 78 mm

**Outside thread:** R3/4“, L = 17 mm

**Inside thread:** Rp3/4“, L = 13 mm

**Fluid temperature:** -30...180 °C

**Ambient temperature:** 0...80 °C

**Pressure:** PN 64 bar (up to 80 °C)

**Ordering number:** BV-02M15-PI